

WHAT IS CLAIMED IS:

1. An auto-focus apparatus comprising:  
an image pickup means for converting light from an object  
through a focus lens system to electric signals and outputting  
5 the signals as image data;  
an A/D converting means for A/D-converting the image data  
to obtain digital image signals;  
an AF evaluating means for outputting an AF evaluated value  
obtained by integrating high-frequency components of brightness  
10 data for the digital image data;  
a sampling means for sampling the AF evaluated value  
obtained by said AF evaluating means while driving a position  
of said focus lens system;  
a recording pixel number setting means for setting a number  
15 of recording pixels of said image pickup means for recording an  
image; and  
a focus driving means for determining a focus according  
to a result of sampling of the AF evaluated value by said sampling  
means and driving said focus lens system to the focus position;  
20 wherein  
amount of shift of said focus lens system for each sampling  
when sampling the AF evaluated value is changed according to a  
number of recording pixels set by said recording pixel number  
setting means.

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2. An auto-focus apparatus according to Claim 1 further comprising:

an AF locking means for holding a focus position after the auto-focus operation is executed; and

5 a disabling means for disabling, under operation of the AF locking means, change of a number of recording pixels in said image pickup means for recording an image by said recording pixel number setting means.

10 3. An auto-focus apparatus comprising:

an image pickup means for converting light from an object through a focus lens system to electric signals and outputting the signals as image data;

15 an A/D converting means for A/D-converting the image data to obtain digital image signals;

an AF evaluating means for outputting an AF evaluated value obtained by integrating high-frequency components of brightness data for the digital image data;

20 a sampling means for sampling the AF evaluated value obtained by said AF evaluating means while driving a position of said focus lens system;

a recording pixel number setting means for setting a number of recording pixels of said image pickup means for recording an image; and

25 a focus driving means for determining a focus according

to a result of sampling of the AF evaluated value by said sampling means and driving said focus lens system to the focus position; wherein

5 during a first auto-focus operation, amount of shift of said focus lens system for sampling the AF evaluated value is set to a maximum and a substantial focus position is calculated; and during second auto-focus operation and thereafter, amount of shift of said focus lens system for sampling the AF evaluated value is set at a position closer to the substantial position  
10 to a minimum and the final focus position is obtained; and

number of times the auto-focus operations are performed is changed according to the number of recording pixels set by said recording pixel number setting means.

15 4. An auto-focus apparatus according to Claim 3 further comprising:

an AF locking means for holding a focus position after the auto-focus operation is executed; and

20 a disabling means for disabling, under operation of the AF locking means, change of a number of recording pixels in said image pickup means for recording an image by said recording pixel number setting means.

5. An auto-focus apparatus comprising:

an image pickup device which converts light from an object through a focus lens system to electric signals and outputting the signals as image data;

an AF evaluating unit which outputs an AF evaluated value obtained by integrating high-frequency components of brightness data for the digital image data;

a recording pixel number setting unit which sets a number of recording pixels of said image pickup device for recording an image; and

amount of shift of said focus lens system for each sampling  
when sampling the AF evaluated value is changed according to a  
number of recording pixels set by said recording pixel number  
setting unit.

6. An auto-focus apparatus according to Claim 5 further comprising:

an AF locking unit which holds a focus position after the auto-focus operation is executed; and

5 a disabling unit which disables, under operation of the AF locking unit, change of a number of recording pixels in said image pickup device for recording an image by said recording pixel number setting unit.

10 7. An auto-focus apparatus comprising:

an image pickup device which converts light from an object through a focus lens system to electric signals and outputting the signals as image data;

15 an A/D converter which A/D-converts the image data to obtain digital image signals;

an AF evaluating unit which outputs an AF evaluated value obtained by integrating high-frequency components of brightness data for the digital image data;

20 a sampling unit which samples the AF evaluated value obtained by said AF evaluating unit while driving a position of said focus lens system;

a recording pixel number setting unit which sets a number of recording pixels of said image pickup device for recording an image; and

25 a focus driving unit which determines a focus according

to a result of sampling of the AF evaluated value by said sampling unit and driving said focus lens system to the focus position; wherein

during a first auto-focus operation, amount of shift of said focus lens system for sampling the AF evaluated value is set to a maximum and a substantial focus position is calculated; and during second auto-focus operation and thereafter, amount of shift of said focus lens system for sampling the AF evaluated value is set at a position closer to the substantial position to a minimum and the final focus position is obtained; and

number of times the auto-focus operations are performed is changed according to the number of recording pixels set by said recording pixel number setting unit.

8. An auto-focus apparatus according to Claim 7 further comprising:

an AF locking unit which holds a focus position after the auto-focus operation is executed; and

a disabling unit which disables, under operation of the AF locking unit, change of a number of recording pixels in said image pickup device for recording an image by said recording pixel number setting unit.

9. A control method for auto-focus apparatus comprising the steps of:

converting light from an object through a focus lens system to electric signals and outputting the signals as image data by an image pickup device;

A/D-converting the image data to obtain digital image signals;

outputting an AF evaluated value obtained by integrating high-frequency components of brightness data for the digital image data;

sampling the AF evaluated value obtained by said AF evaluating step while driving a position of said focus lens system;

setting a number of recording pixels of said image pickup device for recording an image; and

determining a focus according to a result of sampling of the AF evaluated value by said sampling step and driving said focus lens system to the focus position; wherein

amount of shift of said focus lens system for each sampling when sampling the AF evaluated value is changed according to a number of recording pixels set by said recording pixel number setting step.

10. A control method for auto-focus apparatus according to Claim 9 further comprising the steps of:

holding a focus position after the auto-focus operation  
is executed; and

5            disabling, under operation of said holding step, change  
of a number of recording pixels in said image pickup device for  
recording an image by said recording pixel number setting step.

11. A control method for auto-focus apparatus comprising:  
converting light from an object through a focus lens system  
to electric signals and outputting the signals as image data by  
an image pickup device

A/D-converting the image data to obtain digital image signals;

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15      outputting an AF evaluated value obtained by integrating
      high-frequency components of brightness data for the digital
      image data;

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sampling the AF evaluated value obtained by said AF  
evaluating step while driving a position of said focus lens  
system;

setting a number of recording pixels of said image pickup  
device for recording an image; and

determining a focus according to a result of sampling of  
the AF evaluated value by said sampling step and driving said  
25 focus lens system to the focus position; wherein



during a first auto-focus operation, amount of shift of said focus lens system for sampling the AF evaluated value is set to a maximum and a substantial focus position is calculated; and during second auto-focus operation and thereafter, amount of shift of said focus lens system for sampling the AF evaluated value is set at a position closer to the substantial position to a minimum and the final focus position is obtained; and

number of times the auto-focus operations are performed is changed according to the number of recording pixels set by said recording pixel number setting step.

12. A control method for auto-focus apparatus according to Claim 11 further comprising the steps of:

holding a focus position after the auto-focus operation is executed; and

disabling, under operation of said holding step, change of a number of recording pixels in said image pickup device for recording an image by said recording pixel number setting step.